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A PROMISING SYSTEMIC INSECTICIDE  
FOR CONTROL OF CATTLE GRUBS

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Experimental work on several systemic insecticides for the destruction of cattle grubs has been reported by McGregor et al. (1954, 1955) and Roth and Johnson (1955). Although dieldrin, aldrin, lindane, Bayer L 13/59, and Diazinon killed grubs after they were encysted in the back, none of them were effective on small larvae in the body of the host.

During recent years several hundred compounds have been evaluated by the Entomology Research Branch, using laboratory animals as hosts and screw-worms, stable flies, and mosquitoes as test insects. The promising materials have been tested against natural populations of cattle grubs. Early in 1955 two organic phosphorus compounds, Dow ET 57 and ET 15, showed some systemic action against flies and screw-worms in laboratory tests. These compounds have since been tested as oral treatments of cattle for effect on the cattle grub by G. W. Eddy and A. R. Roth at Corvallis, Oregon, and W. S. McGregor and R. C. Bushland at Kerrville, Texas. At Kerrville, R. D. Radeleff has worked on the toxicity of ET 57. A preliminary report of the effectiveness of Dow ET 57 (O,O-dimethyl-O-2,4,5-trichlorophenyl phosphorothioate) which is a purer form of ET 14, another organic phosphorus compound, as a systemic insecticide is presented in this paper.

The first tests in Oregon showed that the compound destroyed grubs already in the backs of cattle at time of treatment and probably prevented some of the smaller ones from appearing in the back.

At Kerrville five cattle were treated orally in June 1955 with ET 57 at the rate of 100 mg./kg. of body weight. The treatment preceded the normal appearance of Hypoderma lineatum (De Vill.) by about two to three months. The animals were examined every week, and a total of 98 grubs appeared in the control animals, but only one each in four of the treated ones. This indicated that the compound had a deleterious effect upon young grubs while they were still in the body of the animal.

In a test late in 1955 at Corvallis, in which treatment preceded appearance of H. lineatum by two months, 100 mg/kg. prevented appearance of many grubs but 50 mg./kg. did not. The data in Table 1 show that 88 percent fewer grubs appeared in the 100-mg. treatment than in the controls.





Table 1.—Number of Hypoderma lineatum grubs appearing in the backs of cattle 2 months after treatment with ET 57.

	Controls (5 animals)	: 50 mg./kg. (8 animals)	: 100 mg./kg. (7 animals)
	8	5	7
	38	9	2
	6	4	0
	0	21	0
	15	16	1
		17	1
		4	0
		0	
Total	67	76	11
Average	13.4	9.5	1.57

On February 10, 1956, 35 calves in South Dakota were treated with ET 57 at 100 mg./kg., and then shipped to Kerrville for study and recording of the grub populations. The insecticide was administered orally, 20 receiving an emulsion and 15 a wettable-powder suspension; 25 were used as controls. At the time of treatment H. lineatum was already appearing in the back. The grubs present were carefully charted on outline maps, so that distinction could be made between these and new grubs. Weekly examinations for six weeks showed a gradual increase in new grubs to 30 per control animal, but none in the animals treated. Most of those present in the back at time of treatment were killed.

L. L. Wade and R. W. Colby, of the Texas Division of the Dow Chemical Company, have provided the following information relative to this compound. On August 1, 1955, five calves were given an oral drench at the rate of 50 mg./kg. of body weight and five were given 100 mg./kg; ten untreated calves served as controls. H. lineatum began to appear on November 15. By February 27, an average of 0.2 grub appeared in the animals receiving 100 mg., 6.4 grubs in those receiving 50 mg., and 9.5 in the controls.

In another test, started on October 19, 60 mg./kg. was administered to nine cattle, and nine served as controls. An average of 0.9 grub per treated animal and 8.2 in the controls appeared after treatment.

D. E. Howell, of Oklahoma Agricultural Experiment Station, has suggested that we report results of an experiment he conducted with this compound. On January 12, 1956, 49 head of cattle were treated at the rate of 100 mg./kg. and an equal number served as controls. At this time the number of grubs averaged 5.8 for the treated and 6.7 for the untreated groups. The treated cattle averaged 1.22 and 0.27 grubs per animal after 30 and 60 days, respectively, whereas the controls showed averages of 2.65 and 0.63. Apparently, the grub season was nearly over at the time this experiment was started.

It is concluded from these experiments and other work that is under way that ET 57 is a very promising insecticide for systemic use in control of cattle grubs. However, considerable research is necessary before its limitations and advantages are known. Little information is yet available on its effectiveness against the northern cattle grub, H. bovis. The best time of treatment is unknown, and the safest and most effective dosages must be determined. No animals have been killed at the dosages reported, but cholinesterase in the blood is lowered, and an occasional animal shows toxic symptoms.

Complete toxicological information is not available, and little is known concerning the storage of the insecticide in meat and milk. Therefore, it should not be suggested for use by stockmen until such information is available.

#### References

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